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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 20

Application Number: 09/939,410
Filing Date: February 27, 2002
Appellant(s): KWAK, JOSEPH A.

Joseph A. Kwak
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 4/14/04.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences, which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1, 2, 5-8, 11-14, 17-28 and 31 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

Appellant's brief includes a statement that claims 3, 9, 15 and 29 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

Appellant's brief includes a statement that claims 4, 10, 16 and 30 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,208,663	Schramm et al.	3-2001
6,128,276	Agee	10-2000
6,529,561	Sipola	03-2003
6,021,124	Haartsen	02-2000
6,522,650	Yonge, III et al.	02-2003

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 4-6, 13, 14 and 16-18 are rejected under 35 U.S.C. 102 (e), as being anticipated by U. S. Patent No. 6,208,663 (Schramm et al.). This rejection is set forth in a final Office Action, mailed on 11/13/03.

Claims 3 and 15 are rejected under 35 U.S.C. 103 (a), as being unpatentable over Schramm et al. in view of U. S. Patent No. 6,128,276 (Agee) . This rejection is set forth in a final Office Action, mailed on 11/13/03.

Claims 7, 8, 11 and 12 are rejected under 35 U.S.C. 103 (a), as being unpatentable over U. S. Patent No. 6,529,561 (Sipola) in view of Schramm et al. This rejection is set forth in a final Office Action, mailed on 11/13/03.

Claims 19-21 and 29-31 are rejected under 35 U.S.C. 103 (a), as being unpatentable over U. S. Patent No. 6,021,124 (Haartsen) in view of Schramm et al. This rejection is set forth in a final Office Action, mailed on 11/13/03.

Claims 22 and 23 are rejected under 35 U.S.C. 103 (a), as being unpatentable over Haartsen in view of Schramm et al. and further in view of U. S. Patent No. 6,522,650 (Yonge, III et al.). This rejection is set forth in a final Office Action, mailed on 11/13/03.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipola in view of Schramm et al. and further in view of Agee. This rejection is set forth in a final Office Action, mailed on 11/13/03.

Claims 24-28 are rejected under 35 U.S.C. 103 (a), as being unpatentable over Haartsen in view of Schramm et al. and further in view of Sipola. This rejection is set forth in a final Office Action, mailed on 11/13/03.

The final office action, Paper No. 12, mailed 11/13/03 is reproduced for convenience.

Claim Rejections - 35 USC § 102

1. Claims 1, 2, 4-6, 13, 14 and 16-18, are rejected under 35 U.S.C. 102(e) as being anticipated by Schramm et al. (US 6,208,663).

Regarding claims 1 and 13, Schramm discloses, in Figs. 3 and 5, a method for adjusting data modulation in a wireless communication system, the method comprising:

receiving data at a transmitter for transmission to a receiver (a radio base stations 22);

formatting the received data into packets for transmission to the receiver, each packet having a particular encoding/data modulation (a radio base stations 22; column 5, lines 46-58);

transmitting the packets to the receiver (column 5, lines 25-45);

receiving the packets at the receiver (mobile stations 12);

for each received packet, generating and transmitting an acknowledgment at the physical layer using a fast feedback channel, if the received packet has an acceptable error rate (column 7, lines 39-53);

retransmitting that received packet at the transmitter, if an acknowledgment for that packet is not received (column 7, lines 39-53);

collecting retransmission statistics (column 7, lines 1-13); and

adjusting each particular encoding/data modulation using the collected retransmission statistics (column 7, lines 1-38); wherein if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (column 7, line 1-column 8, line 22; claim 27).

Regarding claims 2 and 14, Schramm discloses the method wherein the particular encoding/data modulation is forward error correction FEC encoding /data modulation (column 7, line 54-column 8, line 11).

Regarding claims 4 and 16, Schramm discloses the method wherein the packets are transmitted using a single carrier with frequency domain equalization air interface (column 4, lines 49-56).

Regarding claims 5 and 17, Schramm discloses the method wherein the acknowledgments are transmitted on the fast feedback channel using a CDMA air interface (column 4, lines 49-56).

Regarding claims 6 and 18, Schramm discloses the method further comprising at the receiver for each received packet transmitting a negative acknowledgment, if that packet has an unacceptable error rate (column 7, lines 39-45).

Claim Rejections - 35 USC § 103

2. Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schramm in view of Agee (US 6,128,276).

Schramm discloses all the claim limitations as stated above except for: the packets are transmitted using an OFDMA air interface in which frequency sub channels in an OFDMA set may be selectively nulled.

Agee teaches a radio communication method that is compatible with discrete multiple tone and orthogonal frequency-division multiplex-like frequency channelization techniques (column 4, line19-column 5, line 40).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a method that transmit packets using an OFDMA air interface, such as that suggested by Agee, in the method of Schramm in order to allow stationary and linear channel distortion to be modeled as an exactly multiplicative effect on the transmit spreading code

3. Claims 7, 8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipola (US 6,529,561) in view of Schramm et al. (US 6,208,663).

Regarding claim 7, Sipola discloses, in Figs. 2 and 5, a physical layer automatic request repeat system comprising:

a transmitter having (260):

a physical layer transmitter for receiving data, formatting the received data into packets, each packet having a particular encoding/data modulation, transmitting the packets (column 10, lines 7-15; steps 500, 502), and retransmitting packets in response to not receiving a corresponding acknowledgment for a given packet (column 10, lines 16-28;):

an ACK receiver for receiving the corresponding acknowledgment (step 510; column 7, line 60-column 8, line 3); and

a receiver having (264):

a physical layer receiver for demodulating the packets (column 10, lines 29-40);

a hybrid ARQ combiner/decoder for buffering, decoding and detecting packet errors (step 516; column 21-50); and

an acknowledgment transmitter for transmitting an acknowledgment for each packet, if that packet has an acceptable error rate (step 510; column 7, line 60-column 8, line 3).

However, Sipola does not expressly disclose collecting retransmission statistics and adjusting each particular encoding/data modulation using the collected retransmission statistics; if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the

particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation (as in claim 7); and a CDMA air interface (as in claim 11).

Schramm teaches that the radio base station RBS 22 counts the number of requests for retransmitted blocks and use alternative FEC coding and/or modulation scheme (**(low level modulation, in this case QPSK modulation**) when the counted number of erroneously transmitted blocks exceeds some predetermined threshold (column 7, line 1-column 8, line 22; claim 27).

It would have been obvious to one ordinary skill in the art at the time of the invention was made add a collecting retransmission statistics method, such as that suggested by Schramm, in the method of Sipola in order to reduce the probability that the retransmitted block is received erroneously and improve overall system performance (column 4, lines 3-11).

Regarding claim 11, Schramm teaches an ARQ techniques use an alternative modulation/coding scheme using FDMA and CDMA air interface.

It would have been obvious to one ordinary skill in the art at the time of the invention was made to use CDMA, such as that suggested by Schramm, in the radio transmission system of Sipola in order to minimize interference and to increase the capacity data throughput.

Regarding claim 8, Sipola discloses the method wherein the particular encoding/data modulation is forward error correction FEC encoding /data modulation (column 2, line 29-37).

Regarding claim 12, Sipola discloses the system further comprising at the receiver transmitting a negative acknowledgment, if any packet has an unacceptable error rate (column 7, line 60-column 8, line 3).

4. Claims 19-21 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen (US 6,021,124) in view of Schramm et al. ('663).

Regarding claim 19, Haartsen discloses, in Fig. 3, a network using a multi-channel ARQ method transmits data packets from a source 16 to a destination 18 over a communication link that is subdivided into a number of channels. Further, Haartsen, Fig. 4, discloses a MUX 22 (claimed a sequencer), a FIFO 28 (claimed n transmitters transmitting to their associated n receivers), a FIFO 29 (claimed a destination device having n receivers), and a DE-MUX 26 (claimed n hybrid ARQ decoders releasing packets which have an acceptable error rate). Further, Haartsen describes that the network halts the multiplexing of new data packets at the source during a subsequent multiplexing round until the destination positively acknowledges successful reception of a data packet and retransmit the data packets if no acknowledgement is received from the destination after a predefined time-out period.

However, Haartsen does not expressly disclose that the communication system collecting retransmission statistics and adjusting a particular encoding/data modulation

for each of the N transmitter using the collected retransmission statistics; if the collected retransmission statistics indicate a low number of retransmissions, a higher capacity encoding/data modulation scheme is selected as the particular encoding/data modulation and if the collected retransmission statistics indicate a high number of retransmissions, a lower capacity encoding/data modulation scheme is selected as the particular encoding/data modulation.

Schramm teaches a communication system that supports multiple modulation/coding schemes. When connection quality drops and a number of negative acknowledgement signals exceed a predetermined threshold, ARQ techniques use an alternative modulation/coding scheme. Further, Schramm teaches that if desired, the alternative FEC coding and /or modulation scheme can be implemented each time a retransmitted block is requested.

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention was made to add a system that collects retransmission statistics and adjusting a particular encoding/data modulation for each of the N transmitter using the colleted retransmission statistics, such as that suggested by Schramm, in the system of Haartsen in order to use FEC coding that provides increased protection and/or lower level modulation to reduce the probability that the retransmitted block is received erroneously and improve overall system performance (column 4, lines 3-11).

Regarding claim 20, Haartsen discloses the communication system wherein the n signal transmitters each temporarily store a packet that has been transmitted in a buffer memory (column 7, lines 45-64); and

one of the n transmitters receiving an acknowledge signal from an associated hybrid decoder clearing the stored packet in readiness for receipt of another block (column 7, lines 45-64).

Regarding claim 21, Haartsen discloses the communication system wherein the n signal transmitters each temporarily store a packet that has been transmitted in a buffer memory (column 7, lines 45-64); and

one of the n transmitters failing to receive an acknowledge signal from its associated decoder retransmits the packet temporarily stored in its buffer memory (column 8, lines 1-11).

Regarding claim 29, Haartsen discloses the system wherein packets are transmitted using an orthogonal frequency division multiple access air interface in which frequency sub channels in an OFDMA set may be selectively mulled (column 10, lines 40-47).

Regarding claim 30, Haartsen discloses the method wherein the packets are transmitted using a single carrier with frequency domain equalization air interface (column 10, lines 14-30).

Regarding claim 31, Haartsen discloses the method wherein the acknowledgments are transmitted on a fast feedback channel using a CDMA air interface (column 9, lines 18-21).

5. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen in view of Schramm as applied to claim 19 above, and further in view of Yonge, III et al. (US 6,522,650).

Haartsen in view of Schramm discloses all the claim limitations as stated above except for one of the n transmitters clears its buffer memory if an acknowledge signal is not received from its associated decoder after a maximum number of retransmissions and the maximum number of retransmissions is an operator defined integer having a range from 1 to 8.

Yonge illustrates, in Figs. 23 and 24, flow diagrams of a response resolve process performed by the frame transmit process of TX handler. Further, Yonge teaches that the process 444 determines if the NACK-count is greater than the NACK-count threshold (in this example, a threshold of 4). If the NACK-count is determined to be greater then the threshold of 4, then the frame is discarded (column 26, line 60-column 27, line 41).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a retransmission counter and a maximum number of retransmissions (1 to 8), such as that suggested by Yonge, in the transmitter (FIFO) of Haartsen in view of Schramm in order to avoid overflow.

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipola in view of Schramm et al. as applied to claim 7 above, and further in view of Agee.

Sipola in view of Schramm et al. discloses all the claim limitations as stated above except for: the packets are transmitted using an OFDMA air interface; and frequency domain equalization (as in claim 10).

Agee teaches a radio communication method that is compatible with discrete multiple tone and orthogonal frequency-division multiplex-like frequency channelization techniques (column 4, line19-column 5, line 40).

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a method that transmit packets using an OFDMA air interface, such as that suggested by Agee, in the method of Sipola in view of Schramm in order to allow stationary and linear channel distortion to be modeled as an exactly multiplicative effect on the transmit spreading code.

7. Claims 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haartsen in view of Schramm as applied to claims 19-21, 29 and 31 above, and further in view of Sipola (US 6,529,561).

Haartsen in view of Schramm discloses all the claim limitations as stated above except for: receivers requiring a retransmission combines a retransmitted packet with an original transmitted packet to facilitate error correction (as in claims 24 and 26); a transmitter failing to receive an acknowledge signal from an associated decoder encodes that packet employing a different encoding technique from an encoding technique employed in an original transmission of that packet (as in claim 25); n transmitters are incorporated in a base station and the n receiver are incorporated in a subscriber unit (as

in claim 27); and n transmitter are incorporated in a subscriber unit and the n receivers are incorporated in a base station (as in claim 28).

Regarding claims 24 and 26, Sipola discloses a receiver 264 that comprises means 222 for combining a received coded data block punctured by the first puncturing pattern and a received coded data block punctured by the second puncturing pattern.

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add a combiner, such as that suggested by Sipola, in the receiver of Haartsen in order to provide a sufficient dense rage of effective code rates to enable the code rate required by the channel conditions to be selected relatively accurately, which saves the valuable radio resource of the system (column 4, lines 26-30).

Regarding claim 25, Sipola teaches that the channel coder increases the code rate of the coded data block to be retransmitted by puncturing the coded data block coded by the channel coding of the original transmission by using a second puncturing pattern (column 3, lines 51-65).

It would have been obvious to one ordinary skill in the art at the time of the invention was made add a method that uses a different encoding technique when a transmitter failing to receive an acknowledge signal, such as that suggested by Sipola, in the encoding system of Haartsen in order to reduce the probability that the retransmitted block is received erroneously and improve overall system performance.

Regarding claims 27 and 28, Sipola shows, in Fig. 1A, a transceivers 114, an antenna unit 112 that implementing a duplex radio connection 170, and a subscriber terminal 150.

It would have been obvious to one ordinary skill in the art at the time of the invention was made to add n transceivers in the base station or/and subscriber unit, such as that suggested by Sipola, in the multi channel (radio frequency channel) ARQ method of Haartsen in order to maximize data throughput.

(11) Response to Argument

Regarding Group 1:

Applicant argues (Remarks, page 6) that *Schramm method of counting a number of failed attempts of retransmitting a given packet constitutes "collecting retransmission statistics"*.

Examiner disagrees with Applicant contentions. Statistics means collection of numerical data. Schramm clearly discloses that RBS 22 (transmitter) counts the number of requests for retransmitted blocks and uses the alternative FEC coding. Therefore, "colleting retransmission statistics" and "counting requests for retransmitted blocks" have the same meaning.

Applicant argues (Remarks, page 7) that *resetting of the FEC/modulation scheme in Schramm is analogous to the lowering the modulation/coding scheme of the present*

invention. The invention uses the retransmission statistics to adjust the encoding/modulation scheme.

Examiner respectfully disagrees with Applicant contention. The Schramm reference clearly discloses that when connection quality drops and a number of negative acknowledgement signals exceed a predetermined threshold, ARQ techniques use an alternative modulation/coding scheme **(low level modulation, in this case QPSK modulation; if a number of negative acknowledgement signals does not exceed a predetermined threshold ARQ techniques use a high level modulation, in this case 16QAM)**. Each erroneously received block is sufficient to trigger **a selection of a new modulation scheme**; the selecting entity can be based upon the selection of a particular FEC coding/modulation scheme; and/or based upon an evaluation of the current system and/or channel characteristics. Further, Schramm teaches that if desired, the alternative FEC coding and /or modulation scheme can be implemented each time a retransmitted block is requested. In addition, Schramm discloses that the receiving entity could request a particular new FEC coding and/or modulation as part of the retransmission request (column 7, line 39-column 8, line 10).

With respect to claim 1:

Applicant argues (Remarks, page 7) that *Schramm does not teach a fast feedback channel*. Examiner disagrees with Applicant assertion. Schramm clearly discloses that a **control channel** is used for signaling on the uplink (ACK/NAK) (column 6, lines 64-67). A control channel is a separate channel from the data channels. Therefore it is a fast feedback channel.

Regarding Group 2:

Applicant argues (Remarks, page 7) that *Agee does not disclose nulling sub-channel or, in particular, the nulling of the sub-channels as the adjusting of the modulation and coding scheme.*

Examiner disagrees with Applicant contention. Agee teaches an interference **excision** that removes the frequency bandwidth causing the interference, which is part of code nulling. Figs. 7a-b is the discrete multiotone (DMT) method of orthogonal frequency division multiplexing (OFDM). Further, Agee teaches that the base station uses a packetized time division duplex DMT or OFDM modulator and demodulator to perform the inverse frequency channelizer and frequency channelizer operations. DMT provides a solution that nulls the interfering signals (column 14, lines 25-34; column 16, lines 30-41).

Regarding Group 3:

Applicant argues (Remarks, page 7) that *Schramm does not teaches single carrier frequency division equalization*. Examiner disagrees with Applicant assertion. SC-FDE is one of access methodology. Schramm discloses that the invention is applied to all types of access methodologies, which includes SC-FDE.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Saba Tsegaye
Examiner
Art Unit 2662

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July 7, 2004

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